3.1 Representing Relations

**Introduction**

* A set is a collection of distinct objects (in our case numbers).
* An element of a set is one object in the set.

One way to write a set is to list its elements in braces.

For example we can write the set, N, of real numbers from 1 to 5 as:

N={1,2,3,4,5}  
The numbers 1, 2, 3, 4, and 5 are each an element of the set N.

The order of the elements in the set does not matter

**Definition of a Relation:**

**Representing Relations:**

The following relation is written in a table. We

|  |  |
| --- | --- |
| Athlete | Sport |
| Jennifer Botterill | Ice Hockey |
| Jennifer Jones | Curling |
| Jeremy Wotherspoon | Speed Skating |
| Jonathan Cheechoo | Ice Hockey |

can relate the set of athletes to the set of sports

they play  
  
  
a) Describe the relation in words.

b) Represent the relation as a set of ordered pairs.

c) Represent the relation as an **arrow diagram**.

* Two ovals represent the sets
* Each arrow associates an element in the 1st set to the 2nd set
* The order of the words in the ordered pairs, and which column and which oval the words are in in the table and arrow diagram are important
* It makes sense to say “*an apple may be the color red*” but does not make sense to say “red may be the color apple”.
* That is, a relation has direction from one set to the other set

*Why is the direction of the arrows in the arrow diagram important?*

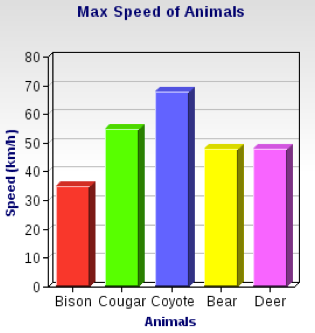
**Your Turn:** Tourist Attraction and Province.

|  |  |
| --- | --- |
| Tourist Attraction | Province |
| Butchart Gardens | BC |
| Icefields Parkway | Alberta |
| Royal Canadian Mint | Manitoba |
| Stanley Park | BC |

1. Describe the relation in words.
2. Represent the relation as a set of ordered pairs.
3. Represent the relation as an arrow diagram.

**Example 2**: Consider the Relation represented by the following graph. Represent the relation as

a) describe in words

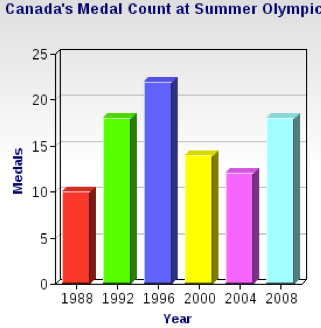
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b) a set of ordered pairs

c) a table and

d) an arrow diagram.

**Your Turn**: Consider the relation represented by the graph.

Represent the relation:

1. in words
2. as ordered pairs
3. as a table
4. as an arrow diagram.

**Practice**

Pg 261

2, 3, 4, 6, 7 a,b 8, Reflect